ISS Utilization Functions (Total Scope)

Function 0.	Defining and Implementing Policy and Strategic Plans
Function 1.	Management of Research Utilization
Function 2.	Preparing and Allocating Budgets
Function 3.	Selecting and Prioritizing Research
Function 4.	Establishing Payload/Experiment Requirements and Feasibility
Function 5.	Developing Cost, Schedule and Risk Assessments
Function 6.	Developing and Qualifying Flight Research Systems
Function 7.	Maintaining and Sustaining Flight Research Systems
Function 8.	Developing Ground Systems
Function 9.	Maintaining and Sustaining Ground Systems
Function 10.	Constructing Ground Facilities
Function 11.	Maintaining Ground Facilities
Function 12.	Certifying Safety of Research Flight and Ground Systems
Function 13.	Managing Missions and Allocating Services
Function 14.	Integrating User Missions - Analytical
Function 15.	Integrating User Missions - Physical
Function 16.	Integrating User Missions - Operational
Function 17.	Conducting Research & Analysis and Disseminating Results
Function 18.	Educating and Reaching Out to the Public (including industry)
Function 19.	Recommending ISS Pre-Planned Product Improvements
Function 20.	Managing Archival of Research Samples, Data and Results

ISS Utilization Function Definitions

Function 0. **Defining and Implementing Policy and Strategic Plans.** This function includes the definition, development and implementation of public policies and strategic plans related to ISS research and utilization. Specific functions include organization and execution of boards, panels, working groups and advisory committees involved in the definition of research plans and processes; definition, development and coordination of national and international cooperation; and the organization of forums for planning development of research programs on a strategic global scale within public policy. Policy and plan implementation is distributed across both headquarters and field center organizations.

Function 1. **Management of Research Utilization.** This function represents the management of research utilization on the ISS. It includes strategic and tactical implementation of management functions.

Function 2. **Preparing and Allocating Budgets.** This function includes long-range and fiscal budget formulation, justification and budget execution of ISS research and utilization. Specific functions include budget preparation, legislative consideration and approval, budget execution oversight and reporting, and evaluation of performance

ISS Utilization Function Definitions - cont'd

Function 3. **Selecting and Prioritizing Research.** This function includes the announcement of research opportunities; operation of non-advocate peer panels in science and corresponding review bodies for technological or commercial projects; programmatic or other evaluations associated with the selection process; and selection / prioritization of experiments, tests, demonstrations, or other research activities on the ISS. This function includes both the investigations and the associated payload manifests to the ISS at the corresponding levels of detail associated with headquarters and field center prioritization and queuing processes. The prioritization function includes determination of national and agency priorities for utilization of the ISS, inclusive of commercial initiatives.

Function 4. **Establishing Payload/Experiment Requirements and Feasibility.** This function defines and documents the payload/experiment requirements necessary to fully accomplish a specific set of research objectives and/or goals. These requirements must be written in sufficient detail to determine the feasibility of successfully completing that investigation with: 1) existing flight experiment hardware, 2) some modification of existing flight experiment hardware, or 3) new flight experiment hardware concepts. In limited cases, these requirements are written to establish the feasibility of providing the capabilities necessary to accomplish a particular range and/or class of experiments through the use of a core facility and experiment unique payloads. When these requirements have been verified as sufficient, they are documented and entered into a program/project configuration management system. This definition covers the Formulation Phase of a project.

ISS Utilization Function Definitions - cont'd

Function 5. **Developing Cost, Schedule and Risk Assessments.** This function includes the development of estimates of the costs for Ground and/or Flight Systems needed to satisfy ISS research requirements as well as estimates of when theses systems will be available for deployment and operations. These cost and schedule assessments can involve estimates for accomplishing the research objectives through the use of existing systems, the modification of existing systems, or the development of new systems. NASA will use these estimates during ISS research planning and during the process of approving new system developments. The fidelity of the cost and schedule estimates will be characterized through an assessment of the risks involved in providing the needed systems within the cost estimate and by the estimated deployment date. NASA's need for high fidelity cost and schedule estimates may require risk reduction through technology development/demonstration efforts as a part of the function. This may include work necessary for NASA to estimate pricing and evaluate commercial proposals. This definition covers the Approval Phase of a project.

Function 6. **Developing and Qualifying Flight Research Systems.** This function represents the design, development, test, integration and evaluation of flight research equipment (i.e. hardware and software) used in the transportation, accommodation or operation of research payloads on the ISS, including the preparation of all necessary documentation, configuration control and conduct of qualification and acceptance/certification testing and acceptance procedures, protocols and processes to ensure that all requirement are met. Flight research equipment refers to subrack payloads, facilities, multi-use equipment, etc. For facilities, the activities described below will often include an integrated effort where the facility developer must include and assess inputs from individual subrack payloads to form a part of their facility effort.

ISS Utilization Function Definitions - cont'd

Function 7. **Maintaining and Sustaining Flight Research Systems.** This function represents the maintenance, operations and sustaining engineering of flight research systems (e.g. facility payloads, EXPRESS Racks, EXPRESS Pallet) through upgrades, replacement, or spares. It represents the recurring costs associated with Function 6.

Function 8. **Developing Ground Systems.** This function represents development of all multi-user, discipline-specific and experiment-unique ground systems necessary to support the successful operation of the flight research systems. It includes all associated systems, subsystems, components or other related items (e.g. communications, data processing, data analysis equipment, GSE, training hardware and simulators) necessary to the ground program. This function excludes the development of ground systems that also serve non-ISS programs and projects. This function represents those major systems that have a non-recurrent cost.

Function 9. **Maintaining and Sustaining Ground Systems.** This function represents the maintenance, operations, and sustaining engineering of multi-user, discipline-specific and experiment-unique ground systems or equipment (e.g. communications, data processing, data analysis equipment, GSE, training hardware and simulators). It represents the recurring costs associated with Function 8. This function excludes maintaining and sustaining ground systems that also serve non-ISS programs and projects.

ISS Utilization Function Definitions - cont'd

Function 10. Constructing Ground Facilities. This function represents major acquisitions in terms of buildings, laboratories and test facilities, including initial outfitting of capital equipment (e.g. overhead cranes, lab benches, autoclaves, hoods) and furniture, associated with multi-user and discipline-specific ISS research and utilization. This function may include construction of ISS-specific portions of facilities that also serve non-ISS programs and projects and represents major acquisitions that have a non-recurrent cost.

Function 11. Maintaining Ground Facilities. This function represents the maintenance, operations, and sustaining engineering associated with buildings, laboratories, and test facilities for multi-user and discipline-specific ISS research and utilization (e.g. Control Centers, Telescience Centers). This function may include maintaining ISS-specific portions of facilities that also serve non-ISS programs and projects. It represents the recurring costs associated with Function 10.

Function 12. Certifying Safety of Research Flight and Ground Systems. This function represents the assessment of payload safety at the system, subsystem, component, and sample/specimen levels, including the safety of procedures, protocols and processes associated with payload, or experiment, transportation, accommodation or operations. This function includes safe design, manufacture, verification, and operation. It also includes preparation and presentation of safety data packages, including integrated safety data packages for a compliment of payloads or experiments. The responsibility for final approval of safety will remain with NASA.

ISS Utilization Function Definitions - cont'd

Function 13. Managing Missions and Allocating Services. This function includes the definition and commitment of services between the end-user, or payload developer, and the Agency in order to ensure timely production of all user hardware, software and documentation deliverables in accordance with pre-agreed milestones. This function also includes the planning, integrating, and scheduling and of all user-related activities necessary for successful multilateral utilization of the space station in flight or on the ground in pre and post-flight periods. User related activities include: (1) transportation assignments to launch vehicles; (2) physical accommodation assignments to the space station user accommodation elements, and; (3) operating period assignments on the space station with corresponding resource allocations for crew time, energy, data transmission and any unique resources specific to individual user activities. In order to plan, integrate and schedule these critical user activities efficiently and effectively on a multilateral basis, the mission management function is also responsible for directing the orderly performance and timely completion of all remaining principle functions which are on the critical path to user transportation, accommodation and operations. In cases where joint program commitments are required among the station partners in order to transport, accommodate, or operate user elements, this activity includes the negotiation of joint program documents and management of the implementation phase.

ISS Utilization Function Definitions - cont'd

Function 14. **Integrating User Missions - Analytical.** The purpose of analytical integration to ensure safe and functional hardware and software interfaces. The 'user' side of the interface may be an experiment, a payload, or a payload complement. The 'operator' side of the interface may be the crew, a rack, a pallet, an ISS laboratory module, an exposed facility, launch vehicle(s), ground operations center(s); any of which may belong to one or more International Partners. Functions necessary to ensure safe and functional interfaces include: negotiation of Interface Control Documents, development of interface verification plans, certification of interface verification procedures, analyses and/or testing to support interface verification, analyses and/or testing to support verification, safety and compatibility of a complement of payloads, development and certification of complement-unique software configurations, development of operational constraints, and real-time support for anomaly resolution.

Function 15. **Integrating User Missions - Physical.** This function includes the physical buildup, testing, validation/ verification of functional interfaces, specialized science processing, and integration of experiments, payloads, or payload complements during the ground processing phase in preparation for launch to the ISS. This function also includes physical deintegration of experiments and payloads at the landing site.

ISS Utilization Function Definitions - cont'd

Function 16. Integrating User Missions - Operational. This function includes the near real-time activity conducted at payload and station operations centers. This includes short term planning and replanning, contingency planning, and responses to unplanned events associated with or otherwise affecting the ISS research program at all levels. Payload training activities are also included in this function.

Function 17. Conducting Research & Analysis and Disseminating Results. This function represents the work of the principal investigator in scientific endeavors, or the project investigator in technological or commercial endeavors, that is directed toward the achievement of research objectives. The investigator specifically leads the development of requirements and objectives for the research, undergoes appropriate research review, is involved in the experiment procedure development and on-board real-time research operations, conducts analysis of the data and/or samples, prepares operational reports, compares results to objectives, submits research reports, provides input to the archiving process, and participates in research conferences to report and discuss results to the research community.

ISS Utilization Function Definitions - cont'd

Function 18. Educating and Reaching Out to the Public (including industry). This function includes the development, dissemination and evaluation of information to the public through a wide variety of methods in order to educate and broaden awareness of the ISS program and its associated benefits and to inspire the next generation of explorers.

Function 19. Recommending ISS Pre-Planned Product Improvements. This function represents the user community recommendations and priorities for improvement of ISS productivity through upgrades, changes, or additions to the ISS spacecraft systems, elements, and/or processes which enhance the quality or quantity of user accommodations or operations, this supports the broader P^3I objectives of the Program.

Function 20. Managing Archival of Research Samples, Data and Results. This function represents the management of ground archiving of research products in accordance with established processes for future use in an accessible manner that ensures preservation of information. The function also includes facilitating and enabling the distribution of results. Research samples, data and results that are proprietary in nature will continue to be maintained by the industrial sponsor.